



Red Hill Bulk Fuel Storage Facility Update

Board Meeting
September 24, 2018



Today's Discussion

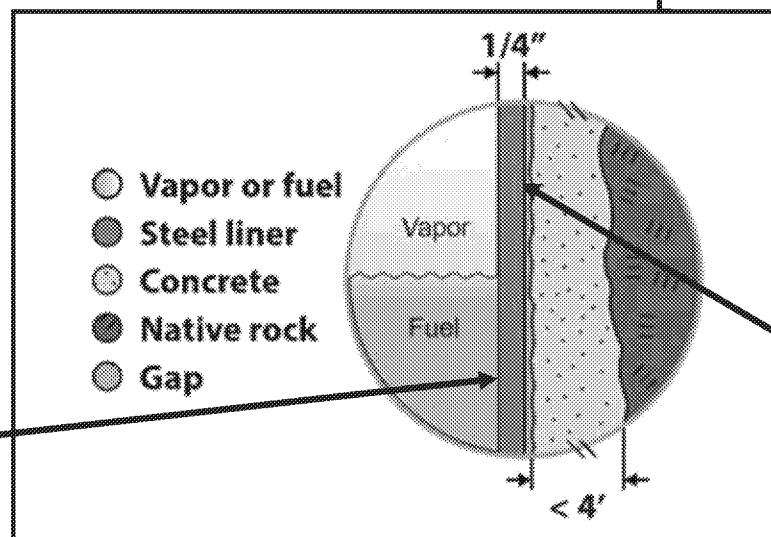
- Visual Examination of Steel Liner Samples (Coupons) Removed from Red Hill Bulk Fuel Facility Tank 14
- Tank upgrade alternatives (TUA) discussion to date and timeline
- Next steps



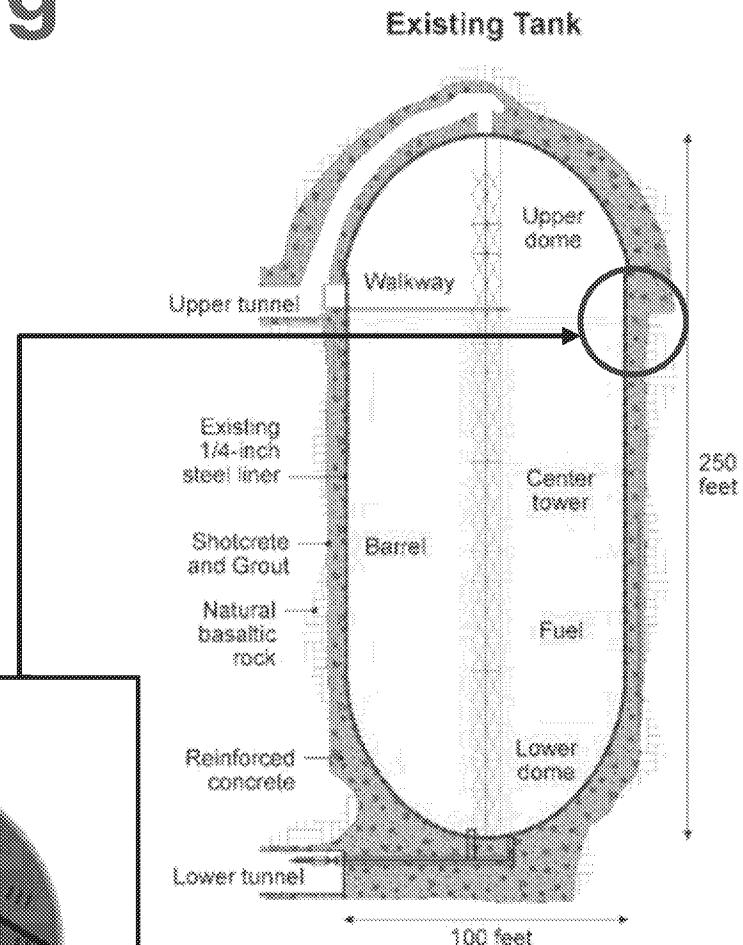
Study Condition of Existing Tank

- Examine fuel side and back side of tanks.
- How well is non-destructive evaluation (NDE) techniques able to identify need for tank repairs

Fuel side
of liner



Back side
of liner





Tank 14 Coupon Viewing

- June 18 -22, 2018 Navy removed ten 12" X 12" coupons from Tank 14
- June 25, 2018 Coupons viewed by regulatory agencies and interested subject matter experts (SMEs)



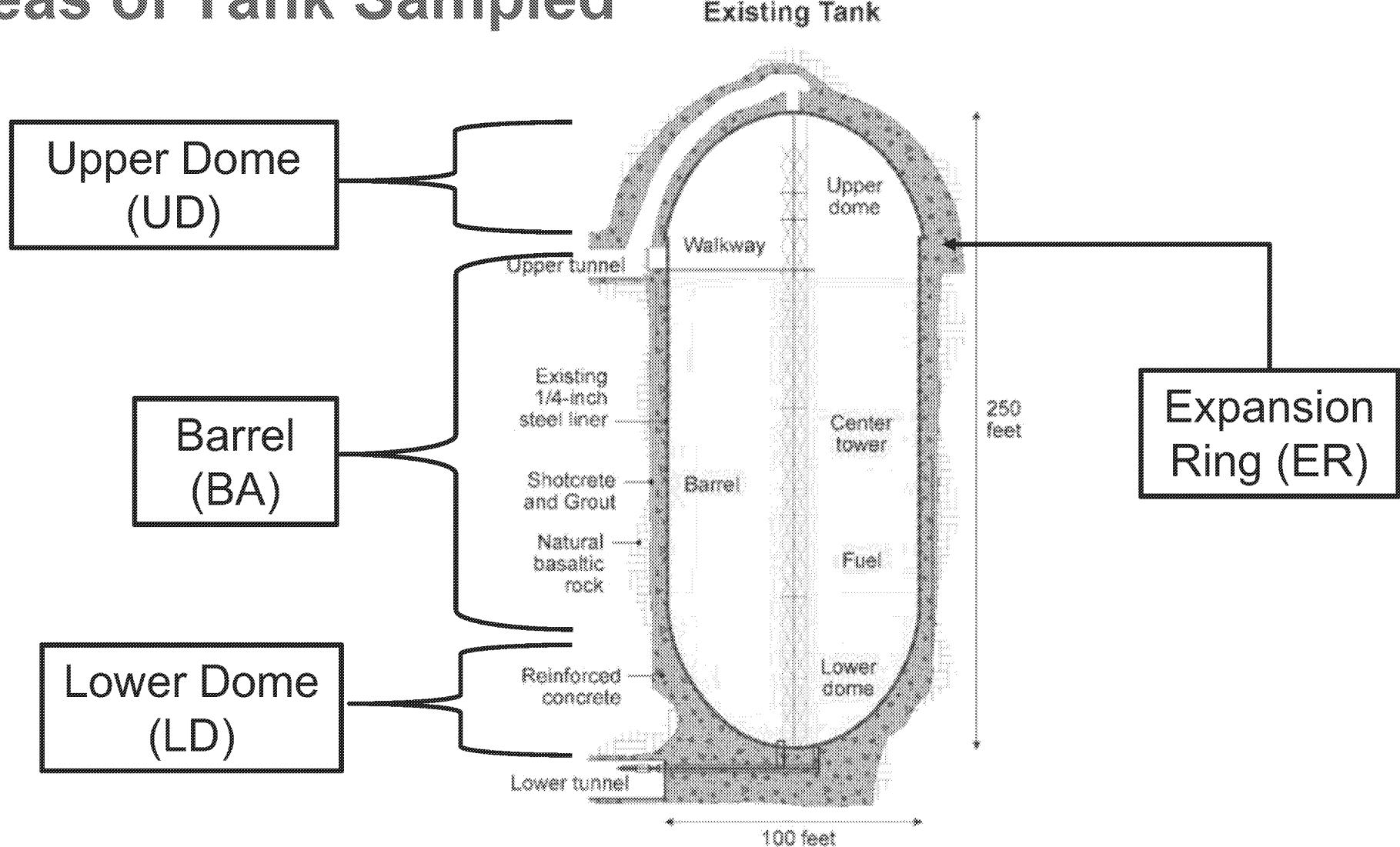
Coupons with
Fuel Side Up



Coupons with
Back Side Up

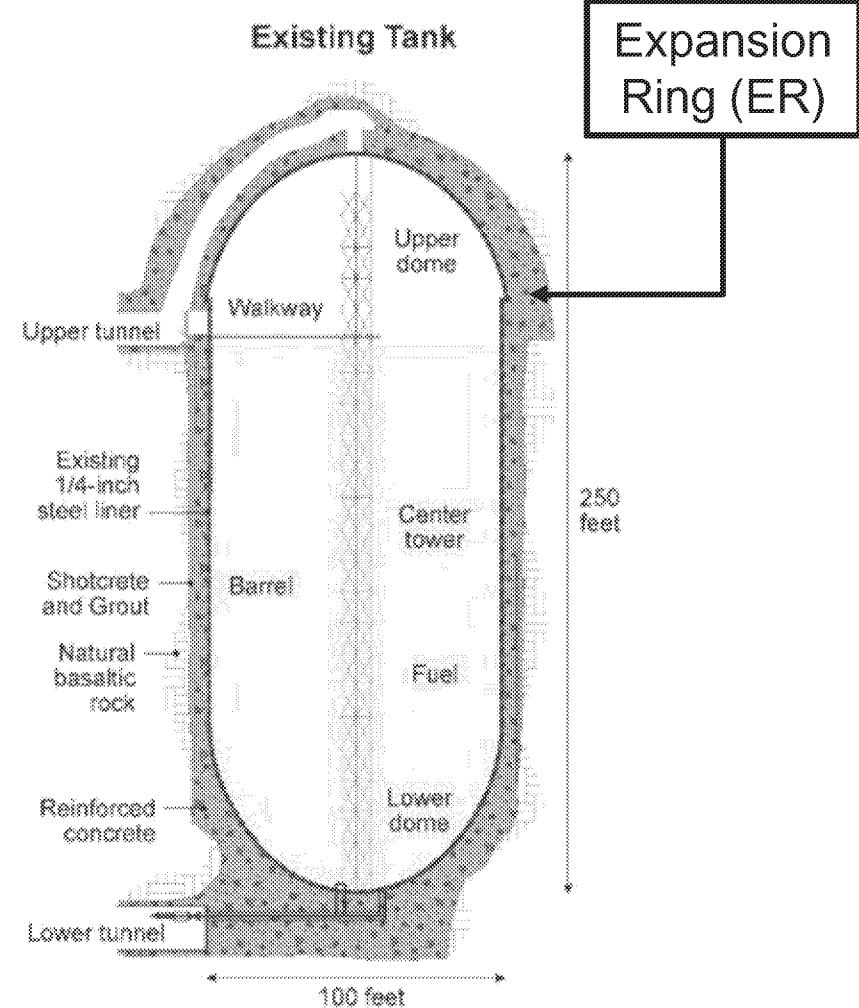
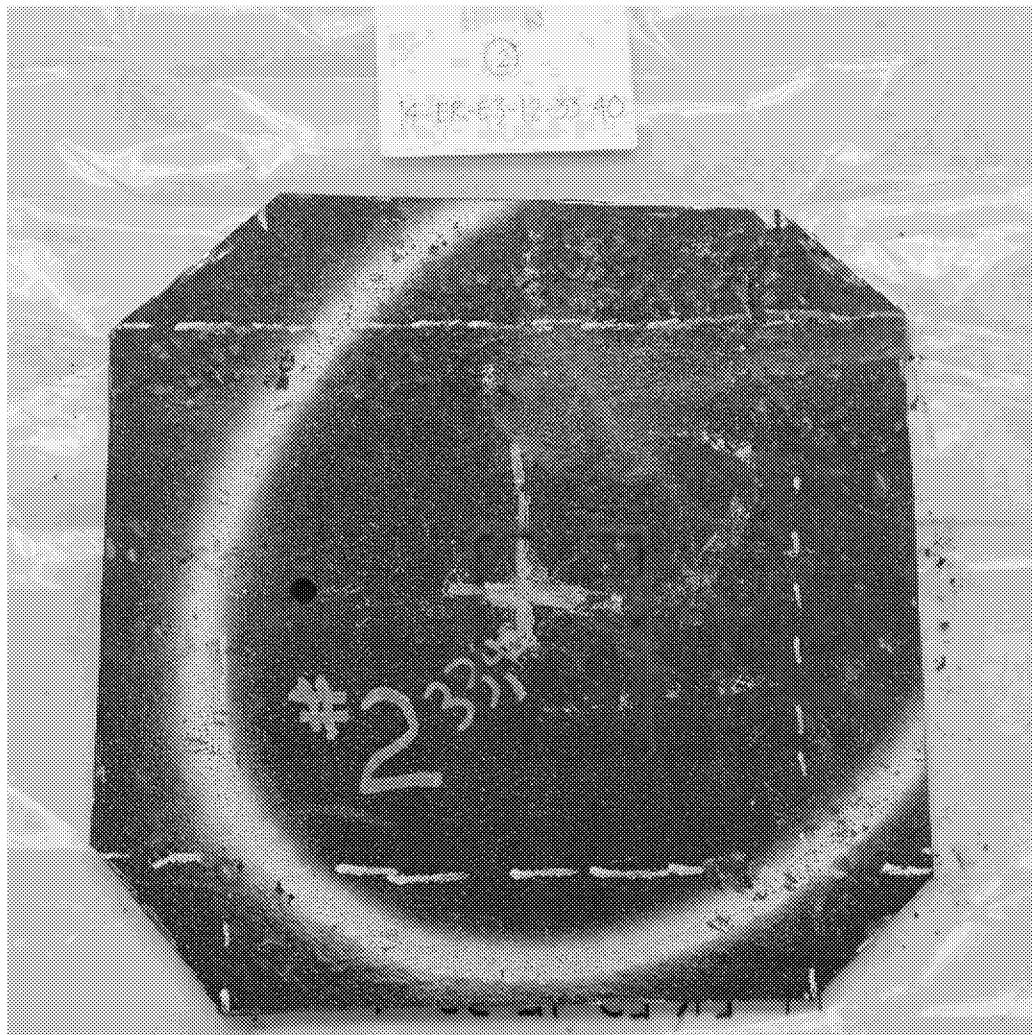


Areas of Tank Sampled





(Coupon #2) Expansion ring – fuel side





(Coupon #2) Expansion ring – back side

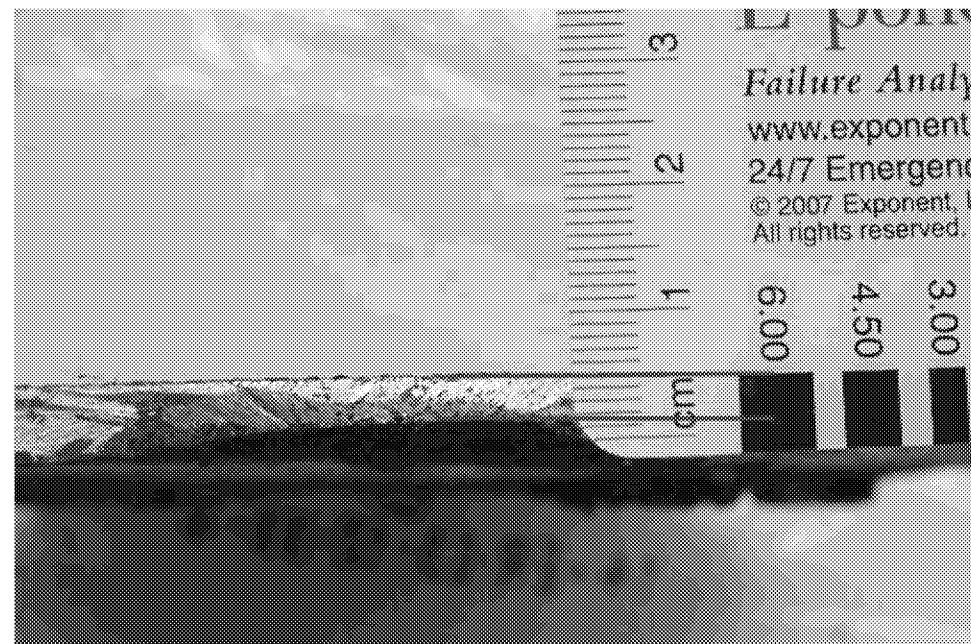


NDE Prediction:

- Remaining thickness: 0.150" to 0.157"

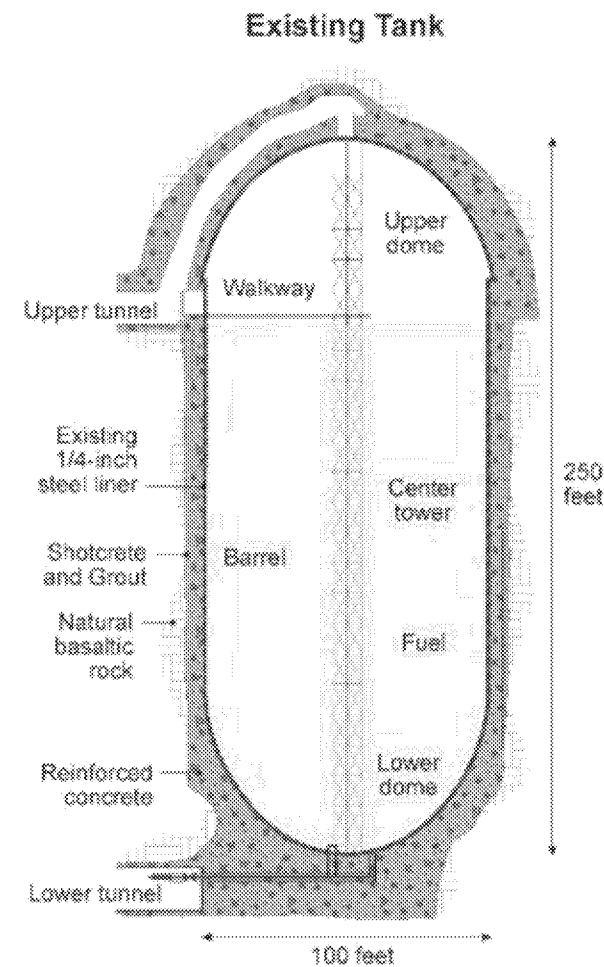
June 25th Observations:

- Apparent remaining thickness:
3mm = 0.118"



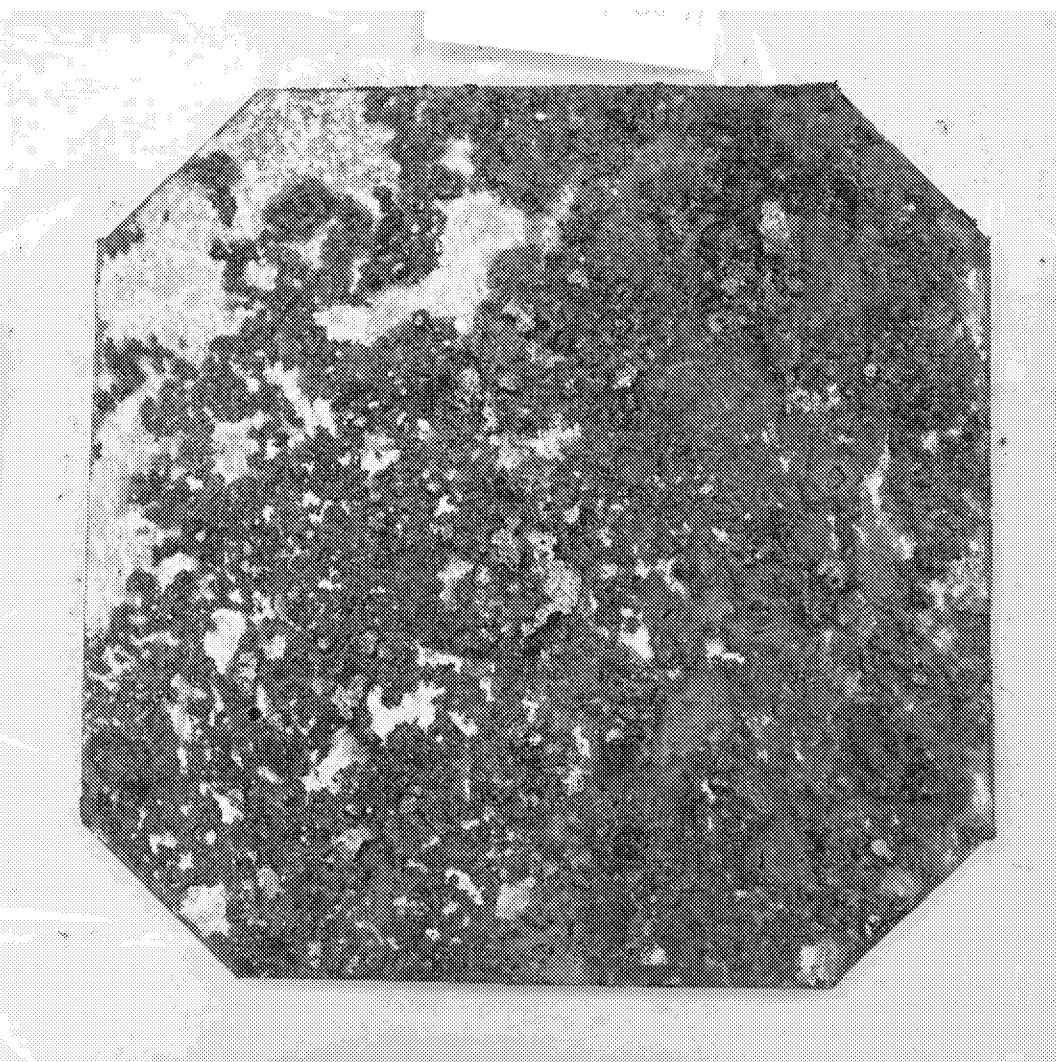


(Coupon #7) Barrel – fuel side





(Coupon #7) Barrel – back side

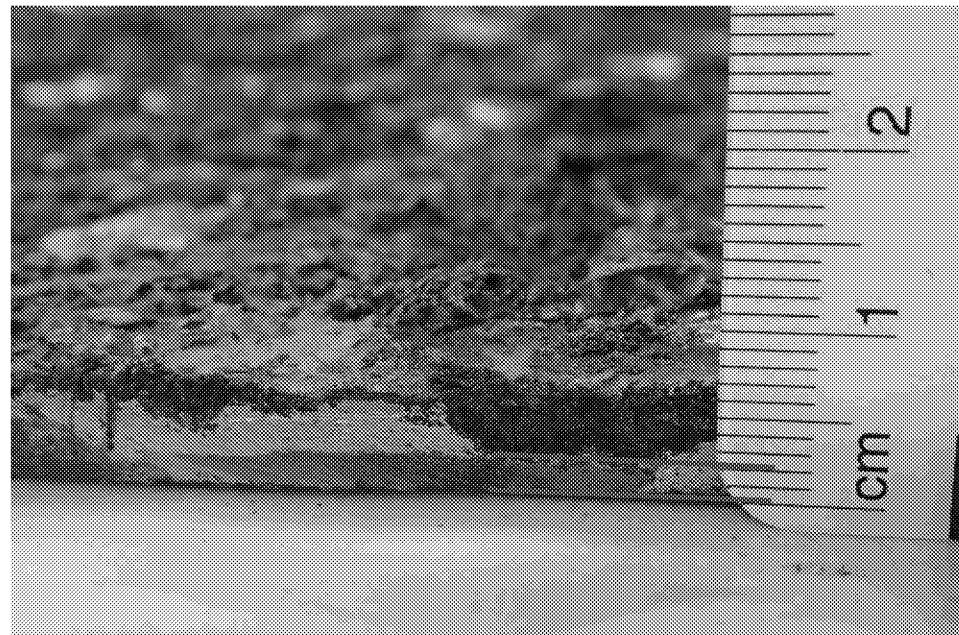


NDE Predictions:

- Minimum remaining thickness: 0.135" to 0.187"

June 25th Observations:

- Apparent remaining thickness: 2mm = 0.079"



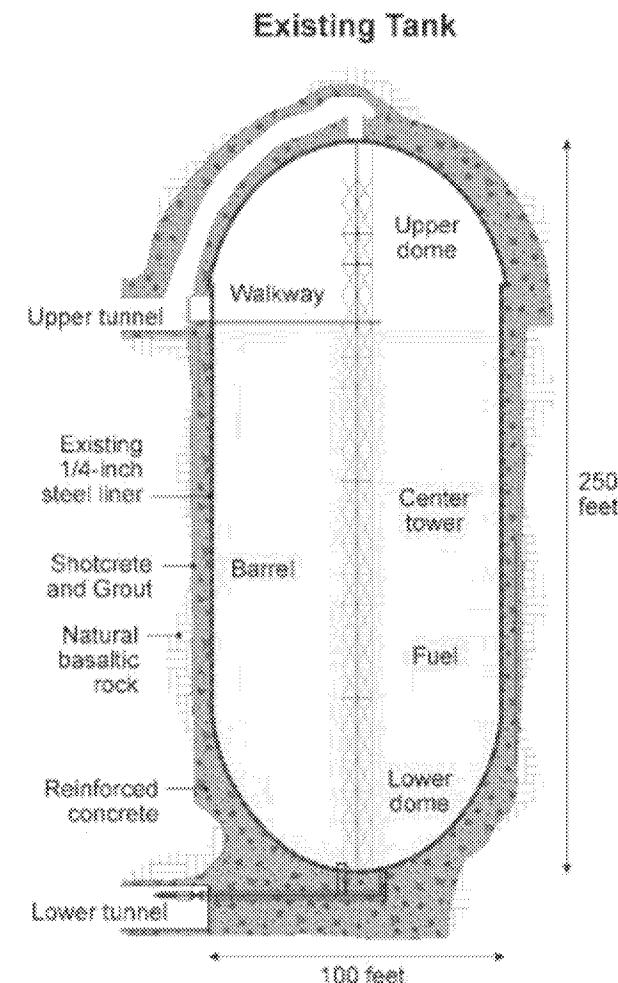
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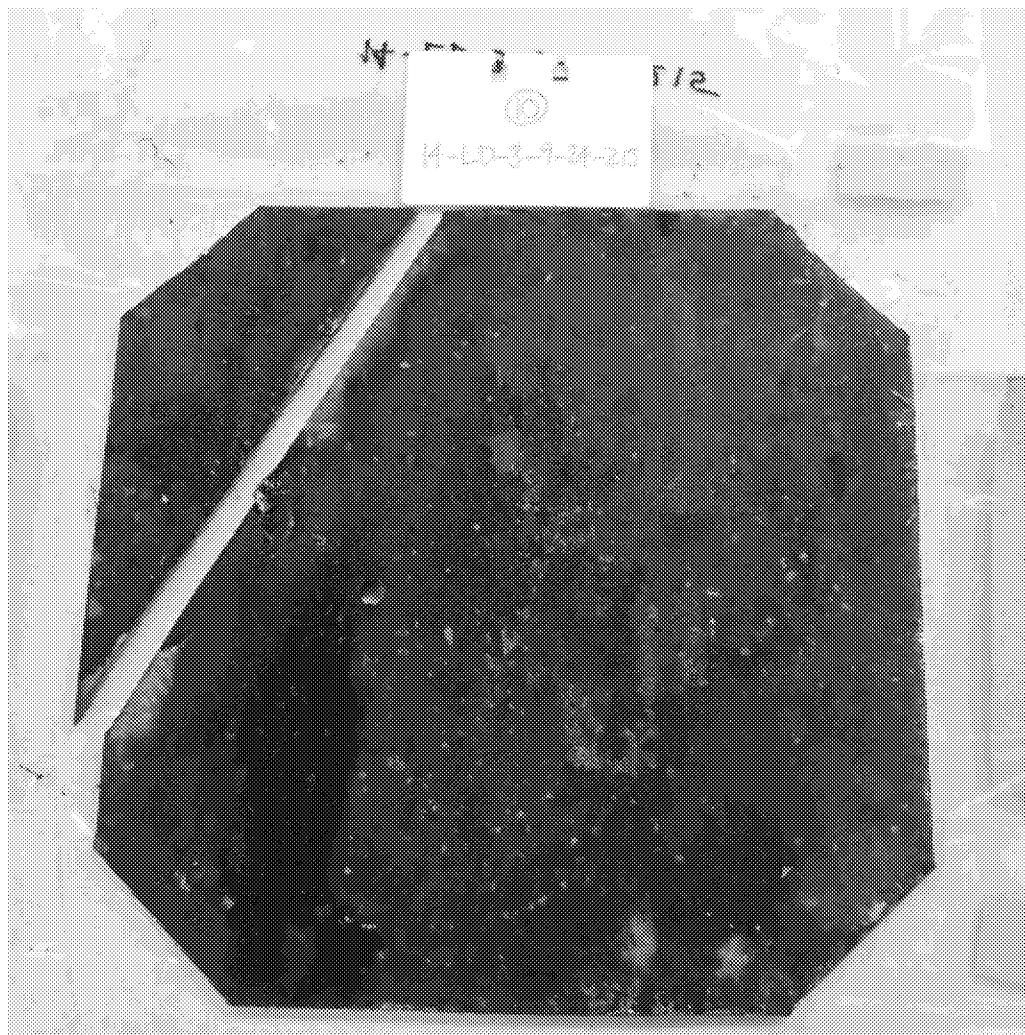
Board of Water Supply
City of Los Angeles, California

(Coupon #10) Lower dome – fuel side





(Coupon #10) Lower dome – back side

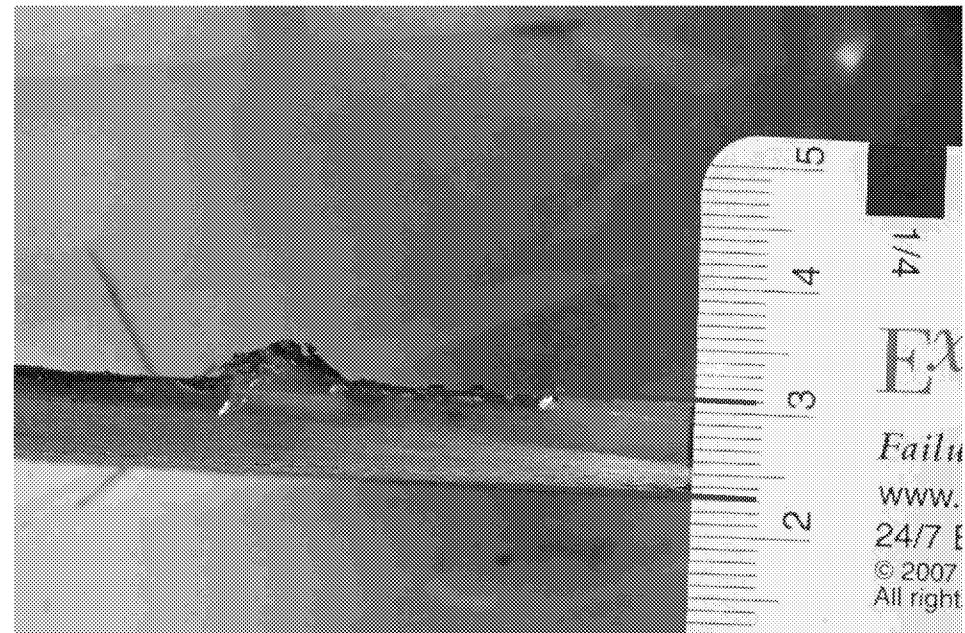


NDE Predictions:

- Remaining thickness expected to exceed 0.200"

June 25th Observations:

- Apparent remaining thickness: 6.3mm = 0.25" (full original thickness)





Coupon Review

- Presence of backside corrosion
 - Half of the coupons exhibited considerably more corrosion than others [Coupons # 1 (UD), 2 (ER), 3 (ER), 7 (BA) and A1(BA)].
 - Potential for through-wall pitting, and associated fuel leaks, is a concern.
- Staining on Backside of Steel
 - Deposits on the backside of some coupons suggest hydrocarbon-staining. [Coupon # 2 (ER), 3 (ER), 7 (BA), 10 (LD) and A1 (BA)]
 - Chemical analysis by independent lab will determine nature of staining.

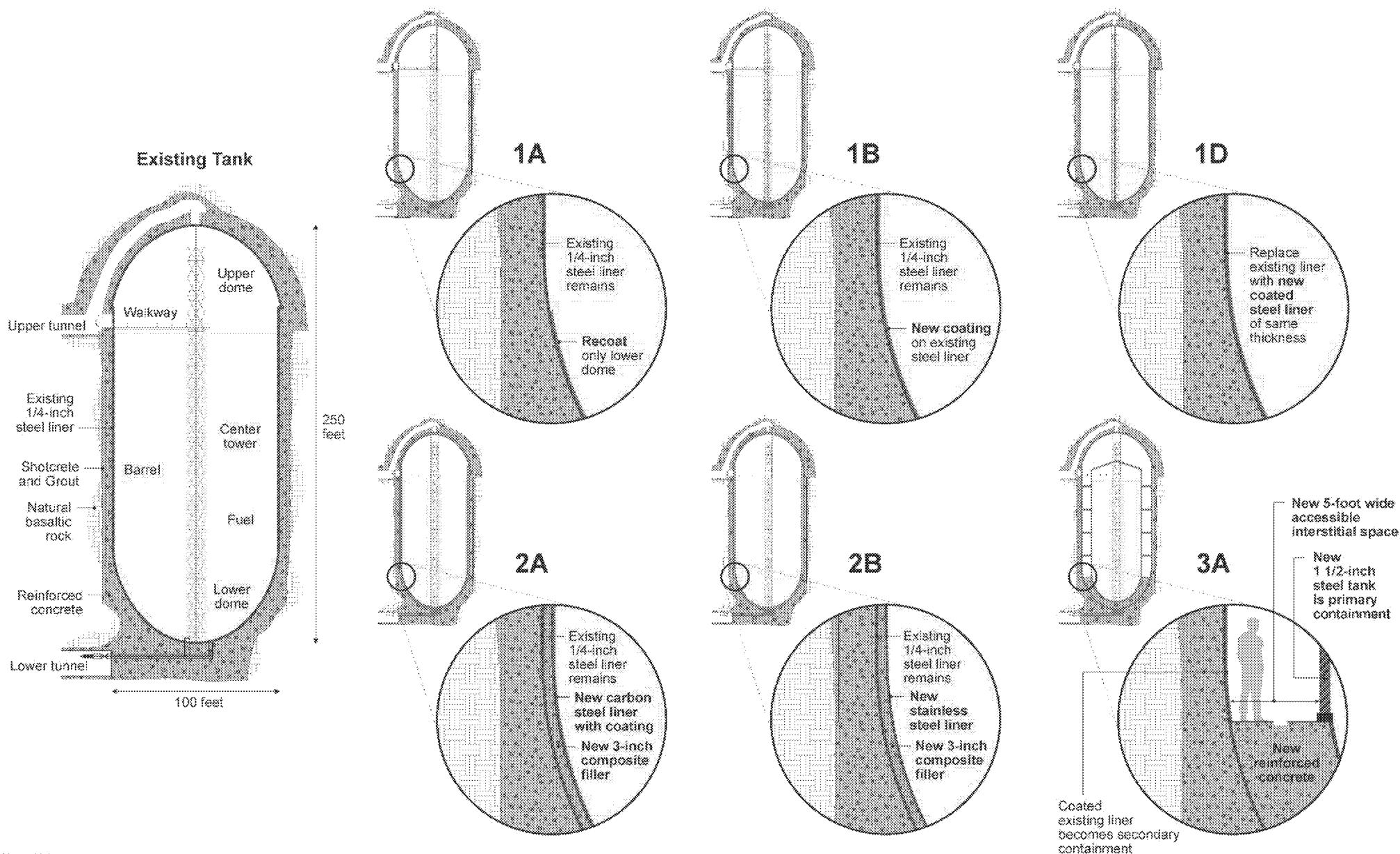


Coupon Review – cont.

- Current NDE Technique Appears to Underestimate Remaining Wall Thickness
 - Corrosion pit depths measured on the cut specimen edges suggest that NDE techniques were not able to locate and measure the thinnest wall of the coupon.
- Work continues under Red Hill Administrative Order on Consent (AOC) to understand tank condition and reach decision on tank upgrade alternative (TUA) selection.

Tank Upgrade Alternatives

Adapted from: Navy, Red Hill AOC SCW Section 3.0 Tank Upgrade Alternatives (TUA), Red Hill Fuel Storage Facility, NAVSUP FLC Pearl Harbor (PR), Hawaii, Final Report, December 2017; <https://www.epa.gov/red-hill/tank-upgrade-alternatives-red-hill>



Note: All figures not to scale

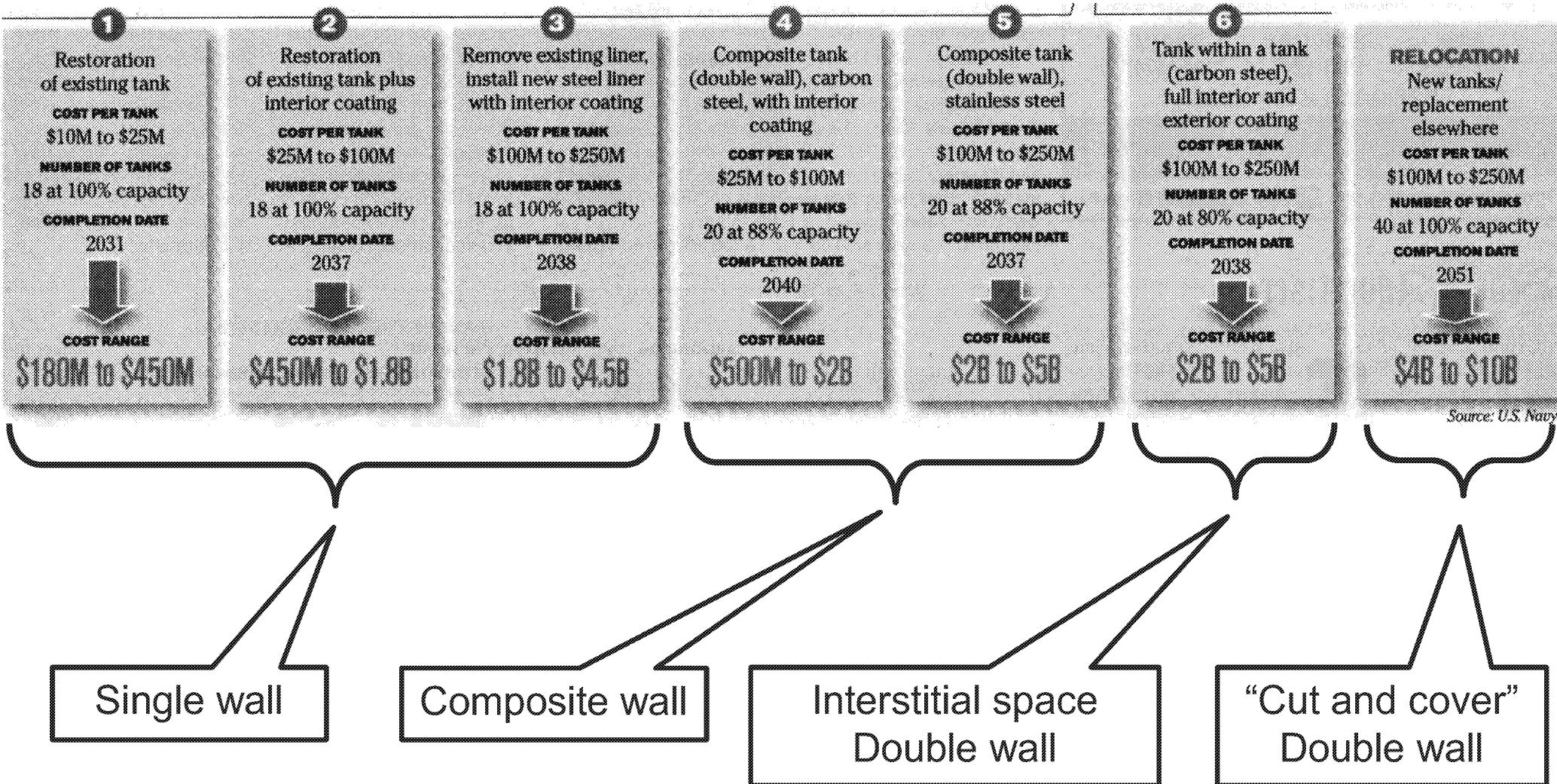


Figure 7.1-1 Kapukaki Tank Layout



Tank Upgrade Alternatives

Source: Star Advertiser, March 19, 2018

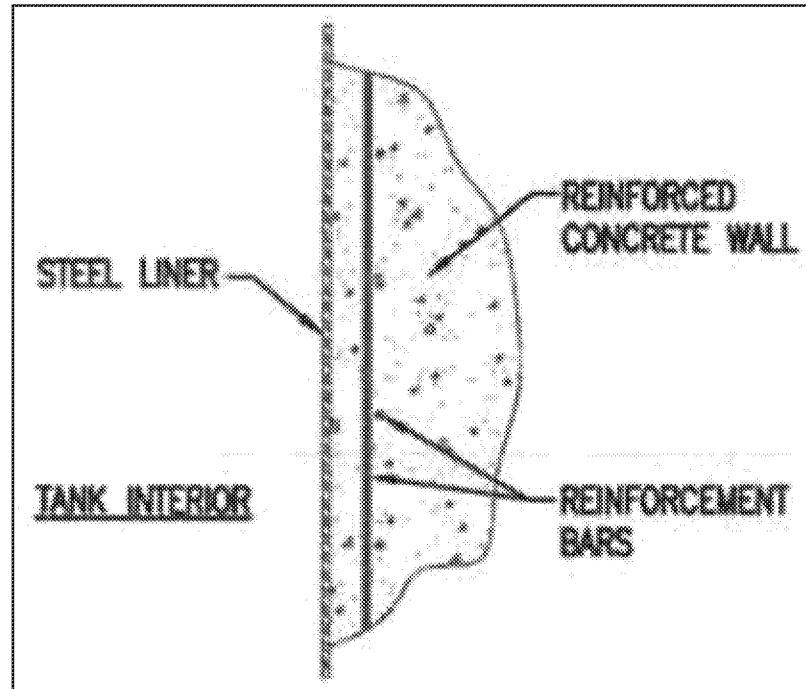




Tank Wall Types and Differences

Single wall

- Existing 1940 single $\frac{1}{4}$ inch wall separating fuel and environment
- Cannot inspect or maintain back side of the wall
- Back side of wall subject to potential groundwater contact and corrosion

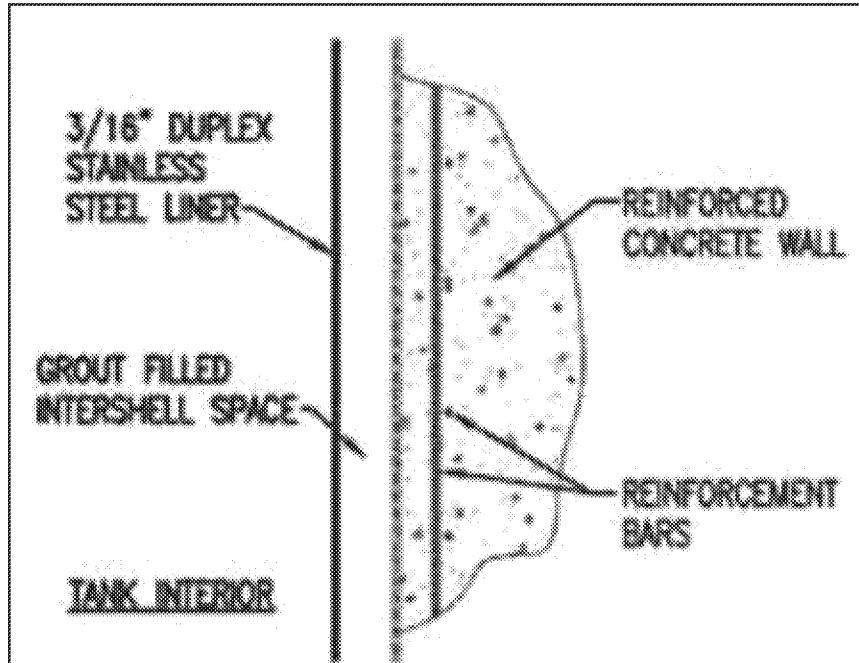




Tank Wall Types and Differences – cont.

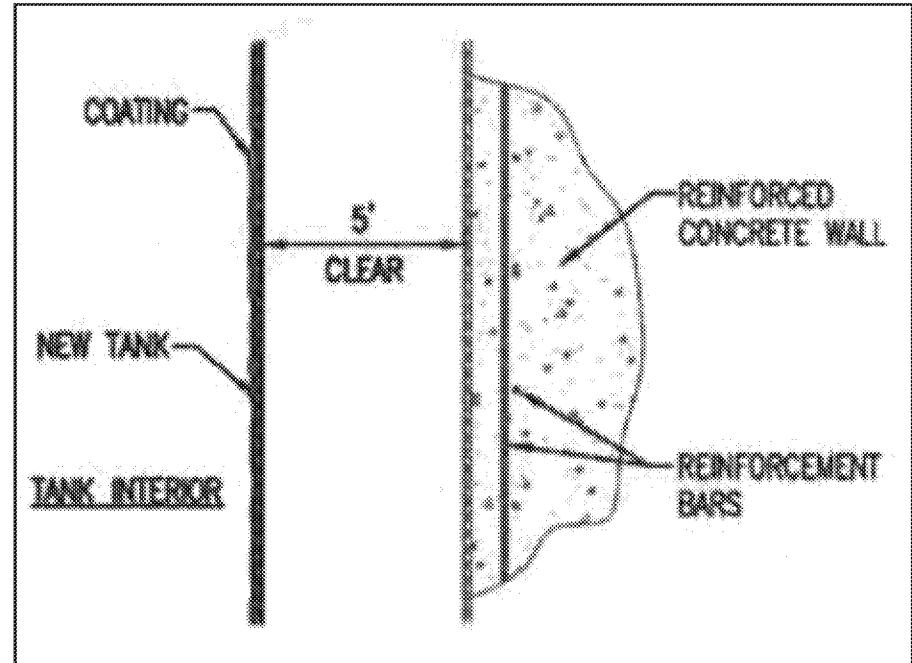
Composite Wall

- Two walls with 3 inch space filled with cement



Interstitial Double Wall

- Two walls with 5 ft. space in between to collect leaked fuel, inspect and maintain inner wall.

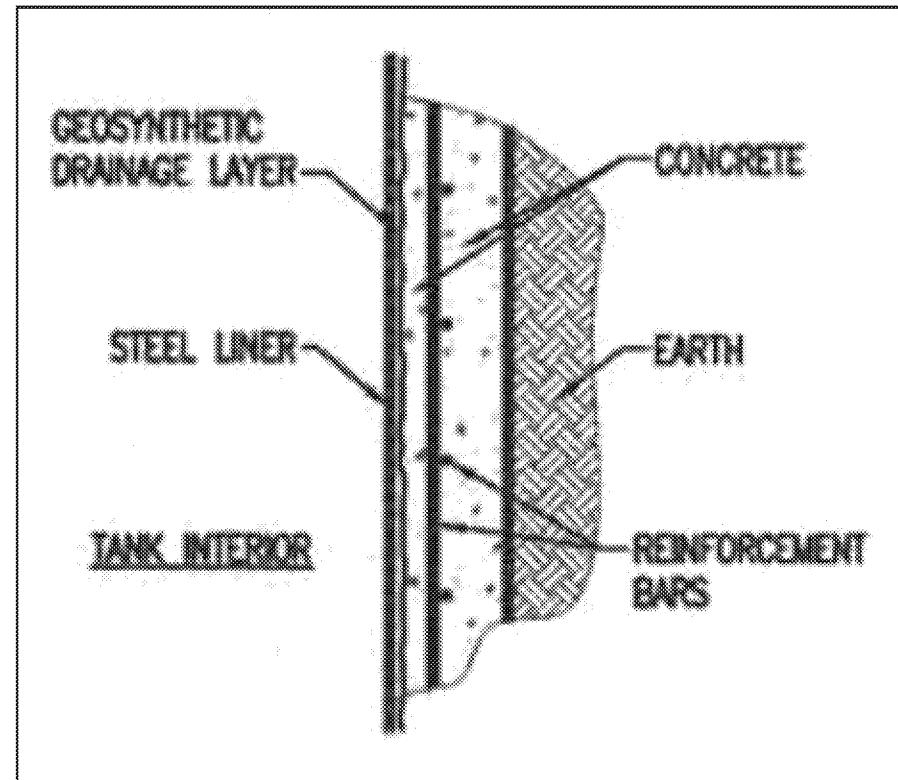




Tank Wall Types and Differences – cont.

“Cut and Cover” Double Wall

- New steel liner, geosynthetic drainage layer and concrete design
- Steel liner is one wall, concrete is the second wall
- No interstitial space to inspect between new steel liner and concrete
- Back side of wall in contact with environment



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Department of Defense

"The Proposed TUA Way Forward. At this time, the Navy and DLA will:

- Continue with sustainment / maintenance of the existing tanks in accordance with current procedures as the Navy's initial best available practicable technology (BAPT) decision submittal."**

other stakeholders such as the U.S. Geological Service and the Board of Water Supply. This series of meetings could take up to several months, but once complete, the Navy and DLA will have 60 days to submit a formal TUA recommendation report for regulatory agency approval.

The Proposed TUA Way Forward. At this time, the Navy and DLA will:

- Communic with sustainment/maintenance of the existing tanks in accordance with current procedures as the Navy's initial best available practicable technology (BAPT) decision submitted.
- Proceed a site visit to the facility to review approval of application of an interior epoxy coating of this improved coating method.

prospective actions being taken by Indo-Pacific Institute for Defense Analyses to revalidate the fuel tank system at Red Hill. Moving forward, these studies will be completed and should feed into the first

Way Forward. The Red Hill fuel tanks were long-service life. A Tank Tightness Test for each tank and state regulations utilizing the Mass Precision Mass Measurement System. Since we have never failed. Further, in 2016 the EPA used baseline evaluation of the systems management of Red Hill with respect to 10 industry and various Petroleum Institute, the American Society of Civil Engineers, the American Society for Testing and Materials, and the National Fire found that the systems, inspection techniques/ practices in place at Red Hill meet or exceed best fuel storage facilities. Moreover, new equipment and

additionally provides a multi-pronged approach to water. Specifically, samples are collected monthly beneath all tanks and its organic compound concentrations using a photodilution. Samples are drawn from monitoring wells at Red Hill lower access times. water interface measurements are taken monthly at the level of each well is gauged and measured for the two-phase liquids using an interface meter.

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ing our environment and drinking water while at the same time protecting our critical infrastructure, both in the event of conflict and humanitarian missions.

Very Respectfully,

R. P. FORT
Rear Admiral, U. S. Navy

Ref: <https://www.cnic.navy.mil/regions/cnrh/om/environmental/red-hill-tank.html>

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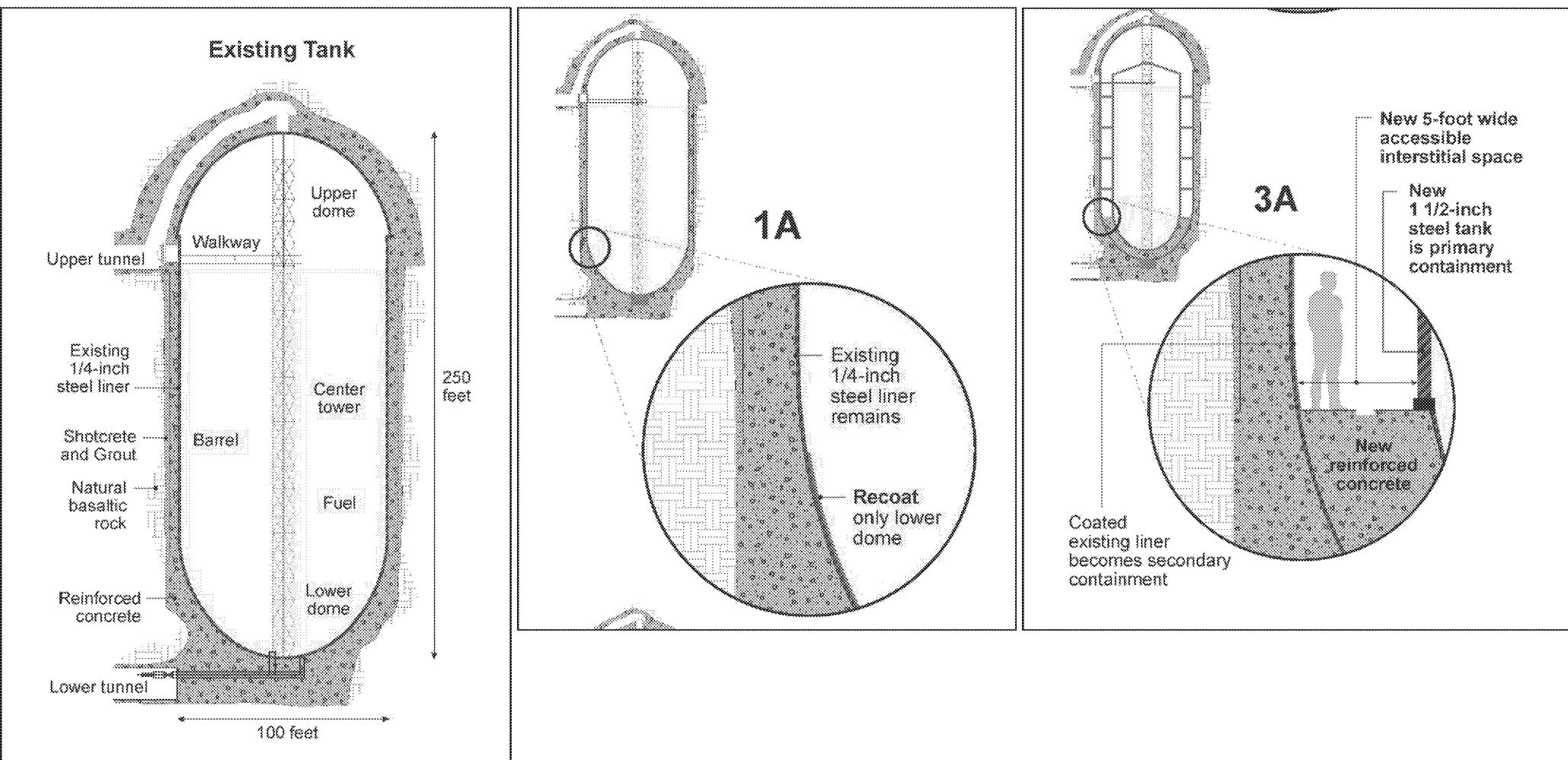
Navy Reasons For TUA Way Forward

- Annual tank tightness testing since 2008 show no failed results
- Red Hill meet or exceed best practices for petroleum terminals and bulk fuel storage facilities based on 2016 inspection.
- Each tank's online fuel inventory system continuously measures tank level down to 1/16 of an inch.
- Ground water protection plan monitors soil vapor beneath all tanks, quarterly groundwater sampling and monthly oil/water interface measurements.
- 2014 fuel release is only reportable release from Red Hill since establishment of underground storage tank regulations in 1988.
- The 2014 release from Tank 5 due to human error, not tank failure.

***Data does not support above reasons**



Single wall v. Secondary containment





Next Steps

- Navy to prepare and submit final TUA report for regulatory agencies review and approval.
- Navy TUA report will include Navy recommended TUA for regulators / public consideration.
- Anticipate TUA report and community meeting – end of 2018 / early 2019.
- Under AOC, TUA decision revisited every 5 years.
- BWS will submit formal comments on recommended TUA following review of final TUA report and attend TUA community meeting.

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Board of Water Supply
City of Sacramento, California

Questions/ Discussion